REMARKS

The Office Action dated September 16, 2004 has been received and carefully noted. The above amendments to the claims, and the following remarks, are submitted as a full and complete response thereto.

In accordance with the foregoing, claims 19-25 have been amended to improve clarity of the features recited therein. No new matter is being presented, and approval and entry are respectfully requested.

Claims 19-25 stand rejected and pending and under consideration.

OBJECTIONS TO THE CLAIMS:

In the Office Action, at page 2, claim 20 was objected to for a minor informality. Claim 20 has been amended to correct such minor informality. Accordingly, it is respectfully requested that the objection to the claim be withdrawn.

REJECTION UNDER 35 U.S.C. § 103:

In the Office Action, at page 2, claims 19-25 were rejected under 35 U.S.C. § 103 as being unpatentable over U.S. patent No. 6,393,007 to Haartsen et al. ("Haartsen") in view of U.S. Patent No. 6,041,046 to Scott et al. ("Scott"). The Office Action took the position that Haartsen and Scott disclose all the aspects of claims 19-25. The rejection is traversed and reconsideration is requested.

Independent claim 19, upon which claims 21-25 are dependent, recites a method for data transmission in a cellular telecommunication system, in which system data are transmitted in units of bursts, each burst occupying a time slot (TS[j]) of one of consecutive frames (F[i]), each respective frame comprising a predetermined number n of time slots, within a each time slot (TS[j]) of each frame (F[i]), data can be transmitted between a first transceiver device and a respective one of a plurality of second transceiver devices either in a first transmission direction from said first transceiver device to said respective second transceiver device or in a second transmission direction from said respective second transceiver device to said first transceiver device opposite to a transmission direction in another time slot of the same frame (F[i]) in which data is transmitted between said first transceiver device and another one of said second transceiver devices. In addition, transmission in said first direction occurs in predetermined and fixed time slots (TS[j]) in each of consecutive frames (F[i], F[i+1]), and transmission in said second direction occurs in different time slots (Ts[k], Ts[l]) in each of consecutive frames (F[i], F[i+1]). In said second direction (UL), during a first frame (F[i]) of consecutive frames respective second transceiver devices perform transmission to said first transceiver device during a kth time slot (TS[k]) assigned thereto for transmission, and during a subsequent second frame (F[i+1]) of said consecutive frames, and respective second transceiver devices perform transmission to said first transceiver device during a different lth time slot (TS[l]) assigned thereto for transmission, with $0 \leq k, l \leq n-1$ and $k \neq l$.

Independent claim 20, upon which claims 21-25 are dependent, recites a method for data transmission in a cellular telecommunication system, in which system data are transmitted in units of bursts, each burst occupying a time slot (TS[j]) of one of consecutive frames (F[i]), each respective frame comprising a predetermined number n of time slots, wherein within a each time slot (TS[j]) of each frame (F[i]), data can be transmitted between a first transceiver device and a respective one of a plurality of second transceiver devices either in a first transmission direction from said first transceiver device to said respective second transceiver device or in a second transmission direction from said respective second transceiver device to said first transceiver device opposite to a transmission direction in another time slot of the same frame (F[i]) in which data is transmitted between said first transceiver device and another one of said second transceiver devices. Further, transmission in said first direction occurs in different time slots (Ts[k], Ts[l]) in each of consecutive frames (F[i], F[i+1]), and transmission in said second direction occurs in predetermined and fixed time slots (TS[j]) in each of consecutive frames (F[i], F[i+1]). In said first direction during a first frame (F[i]) of consecutive frames respective first transceiver devices perform transmission to said second transceiver device during a kth time slot (TS[k]) assigned thereto for transmission, and during a subsequent second frame (F[i+1]) of said consecutive frames, respective first transceiver devices perform transmission to said second transceiver device during a different lth time slot (TS[l]) assigned thereto for transmission, with $0 \leq k, l \leq n-1$ and $k \neq l$.

As will be discussed below, the cited prior art of Haartsen and Scott fail to disclose or suggest the elements of any of the presently pending claims.

Haartsen generally describes in FIG. 3 an effect of time hopping applied to a TDMA/TDD transmission scheme, in accordance with the cited prior art. FIG. 3 shows two subsequent TDMA/TDD frames, indicated hop (k) and hop (k+1), respectively. See column 7, lines 51-57. Furthermore, according to Haartsen, in radio communication systems time slots can be adaptively selected for transmission or reception, for example, when a large amount of data has to be transmitted from a radio access unit to a remote communication unit in the form of a personal computer, asymmetric data links are established. See column 8, lines 19-43. Such links occupy a plurality of time slots in a frame in the direction to the remote communication unit (downlink) and, for example, a single time slot in the direction to the radio access unit (uplink). However, according to Haartsen, by applying time hopping, there is a severe risk that the return channel becomes available before all the data in a frame have been transferred, such that acknowledgement within the same frame is not possible.

Thus, contrary to the assertions made in the Office Action, Haartsen would appear to teach away from the recitations of the presently claimed application and is also silent as to teaching or suggesting the recitations of the transmission in a first direction, transmission in the second direction, and the transmission in the second direction during a first frame of consecutive frames and during a subsequent second frame of the consecutive frames recited in independent claims 19 and 20. To cure the deficiencies of

Haartsen, the Office Action relies on Scott as teaching the recitations of the transmission as recited in independent claims 19 and 20.

Scott generally describes a technique for cyclic time hopping in a multiple access communication system. See column 2, lines 13-19. Each time frame of a TDMA system is divided into multiple time slots. A plurality of user stations, one for each time slot, communicates with a base station. Each user station regularly varies its relative time slot position in a pseudo-random pattern. According to Scott, for systems using base station derived forward link antenna diversity, the time hopping pattern for user stations may be limited to only, e.g., odd time slots (where base slots and user slots are each considered as independent time slots). See column 2, lines 48-58. The base station transmission follows in the even time slot immediately following the corresponding user slot.

However, it is not clear from the description provided in Scott that the transmission occurs in fixed time slots in each of consecutive frames. Contrary to the assertions made in the Office Action, Scott does not teach or suggest, at least, "transmission in said first direction occurs in predetermined and fixed time slots (TS[j]) in each of consecutive frames (F[i], F[i+1])," as recited in claim 19. Although Scott provides that time hopping pattern may be programmed in advance in each of the user stations, thereby allowing each user station to know in advance the time hopping pattern (See Summary of The Invention, column 2, lines 35-47), such time hopping pattern is a pseudorandom hopping pattern in each of consecutive frames. For instance, as illustrated in Figs. 6, 17A, 17B, 26, and 27 of Scott and corresponding descriptions, it appears that

the hop sequence varies for each time frame. Specifically, each time slot in each frame is assigned to a particular user station and for each consecutive frame the assignment varies for each slot.

For example, as shown in Fig. 26, each time frame 2601 comprises a plurality of time slots 2602, each of which supports either a forward link or a reverse link transmission between the base station 104 and a user station 102. See column 12, lines 33-59. In Scott, the Fig. 26 system uses the same time hopping pattern as the Fig. 17B system. However, a "dead" time slot 2603 is declared periodically, preferably once in each time frame 2601. The dead time slot 2603 is thus declared in a pseudorandom pattern, just like the pseudorandom time hopping pattern governing user station communications from time frame 2601 to time frame 2601. By altering the location of the dead time slot 2603 in such a fashion, a number of user stations 102 communicating in odd and even time slots 2602 also varies pseudorandomly. Rather than teaching or suggesting, "“transmission in said first direction occurs in predetermined and fixed time slots (TS[j]) in each of consecutive frames (F[i], F[i+1])," as recited in independent claim 19, Scott limits its description to providing transmitting in a pseudorandom hopping pattern in each of consecutive frames.

Furthermore, although Scott may provide that time hopping pattern may be programmed in advance in each of the user stations, thereby allowing each user station knows in advance the time hopping pattern, such description does not teach or suggest

the "transmission in said second direction occurs in different time slots (Ts[k], Ts[l]) in each of consecutive frames (F[i], F[i+1])," as recited in independent claim 19.

In addition, Scott does not teach or suggest the time hopping sequence in the second direction as recited in independent claim 19. Due to the time hopping over all the time slots of a frame, in accordance with an aspect of the present invention, there is no longer an uplink part and/or a downlink part present in the frame. Thus, interference is averaged between transmission directions, operators, and adjacent cells. In contrast, according to the description provided in Scott, the time hopping pattern described therein is limited to only odd or even time slots. See Fig. 26 and column 12, lines 33-46. A dead time slot may be declared periodically so as to increase the apparent randomness of the user station transmission patterns.

The transmission of the user stations of Scott further fails to teach or suggest the claimed features of independent claim 19, which recite the transmission in the second direction during a first frame of consecutive frames and during a subsequent second frame of the consecutive frames. The transmission provided in Scott does not describe the specific features for the first frame of the consecutive frame and does not describe the specific features of subsequent second frame of the consecutive frames as in independent claim 19. Scott merely provides that by inserting the dead time slot 2603, the number of user stations 102 communicating in odd and even time slots 2602 also varies pseudorandomly. Thus, the transmission recited in independent claim 19 is distinct from the transmission described in Scott.

Dependent claim 2 of Scott provides, "said time slots comprises both user slots and base slots, and said random pattern is restricted to said user slots." However, Scott does not clearly define the time hopping sequence recited in independent claim 19.

Scott does not cure the deficiencies of Haartsen. Rather than providing that "in said second direction (UL), during a first frame (F[i]) of consecutive frames respective second transceiver devices perform transmission to said first transceiver device during a k^{th} time slot (TS[k]) assigned thereto for transmission, and during a subsequent second frame (F[i+1]) of said consecutive frames, respective second transceiver devices perform transmission to said first transceiver device during a different l^{th} time slot (TS[l]) assigned thereto for transmission, with $0 \leq k, l \leq n-1$ and $k \neq l$," as recite in independent claim 19, Scott provides that transmissions from user stations and transmissions from base stations may occur at different frequencies. See column 5, lines 31-52.

Thus, rather than describing that the transmission from the user station and from the base stations occur in such a way that "transmission in said first direction occurs in predetermined and fixed time slots (TS[j]) in each of consecutive frames (F[i], F[i+1]), and transmission in said second direction occurs in different time slots (Ts[k], Ts[l]) in each of consecutive frames (F[i], F[i+1])," Scott provides varying the frequency of transmissions for the user stations and the base stations.

Nothing in Scott teaches or suggests performing "transmission to said first transceiver device during a k^{th} time slot (TS[k]) assigned thereto for transmission, and during a subsequent second frame (F[i+1]) of said consecutive frames, respective second

transceiver devices perform transmission to said first transceiver device during a different l^{th} time slot (TS[l]) assigned thereto for transmission, with $0 \leq k$, $l \leq n-1$ and $k \neq l$," as recited in independent claim 19. Instead, as described in claim 2 of Scott, the time slots comprise both user slots and base slots, and the random pattern is restricted to said user slots. A modulo operation is described in Scott having time hopping patterns for user stations being constructed from the root pattern by application of the following formula: $P_i = \mathrm{mod}(P_0 + i-2, n_{slots})+1$, where $i=1 \ldots n_{slots}$. Where i is the number of time slots in the system; "mod" represents a modulus operation; and P_0 is the root time hopping pattern. Such transmission relationship provided in Scott does not describe the transmission relationship in the second direction as recited in independent claim 19. That is, the recitations of the transmission during the first frame and during a subsequent second frame as recited in independent claim 19 are not taught or suggested by Scott.

Thus, in view of the descriptions provided in Haartsen and Scott, even if both references are combined as suggested by the Office Action, a combination thereof would fail to teach or suggest all the recitations of independent claim 19.

It appears that, in order to arrive to the recitations of the presently claimed invention, the Office Action is improperly rejecting the claims using hindsight by attempting to modify Haartsen and Scott using the teachings of the present invention to then arrive to the claimed features of the claims. Accordingly, in view of the foregoing, it is respectfully requested that the rejection to the claims be withdrawn and the independent claim 19 and related dependent claims be allowed.

Independent claim 20 recites, "...transmission in said first direction occurs in different time slots (Ts[k], Ts[l]) in each of consecutive frames (F[i], F[i+1]), and transmission in said second direction occurs in predetermined and fixed time slots (TS[j]) in each of consecutive frames (F[i], F[i+1]), wherein in said first direction during a first frame (F[i]) of consecutive frames respective first transceiver devices perform transmission to said second transceiver device during a k^{th} time slot (TS[k]) assigned thereto for transmission, and during a subsequent second frame (F[i+1]) of said consecutive frames, respective first transceiver devices perform transmission to said second transceiver device during a different l^{th} time slot (TS[l]) assigned thereto for transmission, with $0 \leq k, l \leq n-1$ and $k \neq l$." Because independent claim 20 includes similar claim features as those recited in independent claim 19, although of different scope, and because the Office Action refers to similar portions of the cited references to reject independent claims 19 and 20, the arguments presented above supporting the patentability of independent claim 19 are incorporated herein to support the patentability of independent claim 20.

Accordingly, in view of the foregoing, it is respectfully requested that the rejection to the claims be withdrawn and the independent claims 19 and 20 and related dependent claims be allowed.

CONCLUSION:

In view of the above, applicant respectfully submits that the claimed invention recites subject matter which is neither disclosed nor suggested in the cited prior art. Applicant further submits that the subject matter is more than sufficient to render the claimed invention unobvious to a person of skill in the art. Applicant therefore respectfully requests that each of claims 19-25 be found allowable and this application passed to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the applicant's undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the applicant respectfully petitions for an appropriate extension of time.

Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,

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